

CLAIMS

What is claimed is:

1. A thrust pad assembly for mounting a substrate in an electroplating system, comprising:

a contact ring for electrical connection to the electroplating system and engaging the substrate; and

a variable pressure application system operably engaging said contact ring for applying a central pressure to a center region of the substrate through said contact ring and a peripheral pressure less than said central pressure to an edge region of the substrate through said contact ring.

2. The thrust pad assembly of claim 1 further comprising a thrust pad engaged by said variable pressure application system and engaging said contact ring for transmitting said central pressure and said peripheral pressure to said contact ring.

3. The thrust pad assembly of claim 1 wherein said variable pressure application system comprises a central air source for applying said central pressure to the center region of the substrate through said contact ring and a peripheral air source for applying said peripheral pressure to the edge region of the substrate through said contact ring.

67,200-1156
2003-0084

4. The thrust pad assembly of claim 3 further comprising a thrust pad engaged by said variable pressure application system and engaging said contact ring for transmitting said central pressure and said peripheral pressure to said contact ring.

5. The thrust pad assembly of claim 3 further comprising a platen having a plurality of central air openings provided in pneumatic communication with said central air source and a plurality of peripheral air openings provided in pneumatic communication with said peripheral air source for transmitting said central pressure to the contact ring and the center region of the substrate and said peripheral pressure to the contact ring and the edge region of the substrate.

6. The thrust pad assembly of claim 5 further comprising a thrust pad engaging said contact ring and engaged by said air platen for transmitting said center pressure and said peripheral pressure to said contact ring.

7. An electroplating system for electroplating a metal on a substrate, comprising:

- a bath container for containing an electrolyte bath;
- an anode for immersion in said electrolyte bath;
- a current source for electrical connection to said anode;
- a contact ring electrically connected to said current source for engaging the substrate; and
- a variable pressure application system operably engaging said contact ring for applying a central pressure to a center region of the substrate through said contact ring and a peripheral pressure less than said central pressure to an edge region of the substrate through said contact ring.

8. The system of claim 7 further comprising a thrust pad engaged by said variable pressure application system and engaging said contact ring for transmitting said central pressure and said peripheral pressure to said contact ring.

9. The system of claim 7 wherein said variable pressure application system comprises a central air source for applying said central pressure to the center region of the substrate through said contact ring and a peripheral air source for applying said peripheral pressure to the edge region of the substrate through said contact ring.

67,200-1156
2003-0084

10. The system of claim 9 further comprising a thrust pad engaged by said variable pressure application system and engaging said contact ring for transmitting said central pressure and said peripheral pressure to said contact ring.

11. The system of claim 9 further comprising a platen having a plurality of central air openings provided in pneumatic communication with said central air source and a plurality of peripheral air openings provided in pneumatic communication with said peripheral air source for transmitting said central pressure to the contact ring and the center region of the substrate and said peripheral pressure to the contact ring and the edge region of the substrate.

12. The system of claim 11 further comprising a thrust pad engaged by said variable pressure application system and engaging said contact ring for transmitting said central pressure and said peripheral pressure to said contact ring.

67,200-1156
2003-0084

13. A method of electroplating a metal on a substrate, comprising the steps of:

providing an electrically-conductive contact ring in contact with a backside of the substrate;

immersing said contact ring and the substrate in an electrolyte bath;

immersing an anode in said electrolyte bath;

applying a central pressure to a central region on the substrate through said contact ring;

applying a peripheral pressure to an edge region on the substrate through said contact ring, said peripheral pressure smaller in magnitude than said central pressure; and

applying a voltage potential to said contact ring and said anode.

14. The method of claim 13 wherein said central pressure is greater than about 14 psi and said peripheral pressure is less than about 14 psi.

15. The method of claim 13 wherein said anode comprises copper.

67,200-1156
2003-0084

16. The method of claim 15 wherein said central pressure is greater than about 14 psi and said peripheral pressure is less than about 14 psi.

17. The method of claim 13 further comprising the steps of providing a thrust pad in contact with said contact ring and providing a platen having a plurality of central air openings and a plurality of peripheral air openings in contact with said thrust pad, and wherein said applying a central pressure to a central region on the substrate comprises the step of directing central air pressure through said plurality of central air openings against said thrust pad and wherein said applying a peripheral pressure to an edge region on the substrate comprises the step of directing peripheral air pressure through said plurality of peripheral air openings against said thrust pad.

18. The method of claim 17 wherein said central air pressure is greater than about 14 psi and said peripheral air pressure is less than about 14 psi.

19. The method of claim 17 wherein said anode comprises copper.

20. The method of claim 19 wherein said central air pressure is greater than about 14 psi and said peripheral air pressure is less than about 14 psi.

21. The method of claim 13 wherein said applying a peripheral pressure to an edge region on the substrate comprises applying a peripheral pressure of from about 0 psi to about 14 psi to the edge region on the substrate to form a metal layer having a thickness of from about 100 angstroms to about 500 angstroms on the edge region.

22. The method of claim 13 wherein said applying a central pressure to a central region on the substrate comprises applying a central pressure of greater than about 14 psi to the central region on the substrate to form a metal layer having a thickness of greater than about 7,000 angstroms to the central region.